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EXAMINER	
PRICE, CARL D	

ART UNIT	PAPER NUMBER
3749	

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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/521,517	GUENTHER ET AL.	
	Examiner	Art Unit	
	CARL D. PRICE	3749	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *20 December 2007*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-7 and 9-21* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-7 and 9-21* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Response to Arguments

Applicant's arguments with respect to claims **1-7** and **9-21**have been considered but are moot in view of the new ground(s) of rejection.

***

Applicant has amended the claims to be of a scope not previously considered. Consistent with applicant's argument that the prior art relied on in the previous office action fail to show, disclose and/or teach certain aspects of applicant's invention now recited in the claims filed on *, applicant has amended the claims to include at least the following:

1.(Currently amended)

A process for operating a yellow flame burner comprising:

providing a yellow flame burner adapted ford domestic heating with a Fischer-Tropsch-derived fuel **comprising about 40 wt.% or more of a Fischer Tropsch product comprising 80 wt.% or more of iso-paraffins and normal normal parafins**;

burning the Fischer-Tropsch-derived fuel in the burner to obtain flue **gasses** and a heat of combustion; and

performing one or more procedure selected from the group consisting of heating water by indirect heat exchange with the flue **gasses** in one or more boiler and heating space directly with the flue **gasses**.

The examiner appreciates applicant's inclusion in the remarks of the flowing definition of diesel fuel which acknowledges that "No. 2 diesel fuel is very similar to No. 2 fuel oil", and has a wider boiling range than No. 1.:

> "No. 1 diesel fuel (sometimes called super-diesel) is generally made from virgin or hydrocracked stocks having cetane numbers above 45. It... has a boiling range of

> from about 360 °F to 600 °F (182 to 316°€) and is used in high-speed engines in automobiles, trucks, and buses.
>
> No. 2 diesel fuel is very similar to No. 2 fuel oil, and has a wider boiling range than No. 1. It usually contains cracked stocks and may be blended from naptha, kerosine, and light cracked oils from the coker and the fluid catalytic cracking unit. Limiting specifications are flash point [125 °F (52°C)], sulfur content (0.05% max.), distillation range, octane number or cetane index (40 rain.), percent aromatics, and cloud point.
>
> J. Gary, et al. Petroleum Refining, Technology and Economics (4nd Ed. 2001) 17- 18."

Applicant further remarks that "A diesel fuel generally is burned by a vehicle traveling from one destination to another on a road. Diesel fuel emissions generally are distributed into the atmosphere-a non-enclosed area. In contrast, air that contains emissions from the burning of home heating oil is emitted into an enclosed space over a period of time, and must be Safe for people to breathe." In this regard the examiner does not dispute applicant's observation of the known use of diesel fuel as a suitable fuel for vehicles. The examiner also affirms the applicant's acknowledgement that when air that contains emissions from the burning of home heating oil is emitted into an enclosed space over a period of time and must be safe for people to breathe. Indeed, it is this widely established fact and appreciation by not only those skilled in art of burner operation and fuel fired heating that forms the basis for the examiner's determination that the claimed invention would have been obvious to a person having ordinary skill in the art at the time of the invention. This is because issues concerning safety as well issues related environment pollution would have indeed been the motive for persons having ordinary skill in the art of combustion to select and or bring together already known techniques for mitigating issues related to unsafe and excessive environmental pollution. Such the solutions provided in the teachings of **Suppes et al** (Compression-Ignition Fuel Properties of Fischer-Tropsch Syncrude, Ind. Eng. Chem. Res. 1998, 37 2029-2038), **US004764266 (Chen et al), US005807413 (Wittenbrink et al)**, **US006787022 (Berlowitz et al**) and **US003808802 (Tanasawa)** and on which the examiner relies to reject applicant's claims as being obvious under 35 USC 103**.**

Further in this regard, and in support of the examiner position that a person having ordinary skill in the art would readily appreciate the similarities between and readily substitute

suitable alternative liquid fuels, such as kerosene and Diesel fuel, were there is a reasonable expectation of success, applicant's attention is directed to the new added prior art reference **of GB 2215032 A (Shin)** discussed and reproduced in part herein below.

While acknowledging certain drawbacks of using high ignition point liquid fuels (i.e. - kerosene and Diesel fuel) in portable space heaters **GB 2215032 A (Shin)** nonetheless recognizes kerosene and Diesel fuels as interchangeable and suitable equivalent fuels for use in space heaters. **GB 2215032 A (Shin)** teaches that increased efficiency and lowered environmental pollutants result when applying suitable preheating and gasifying techniques to the combustion of kerosene and Diesel fuels.

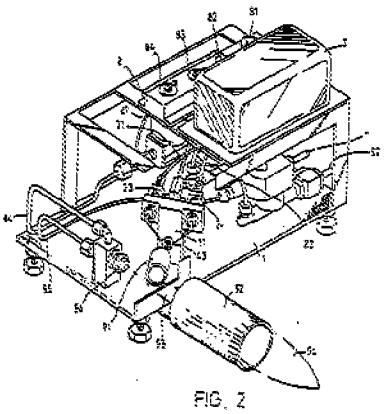


FIG. 2

TITLE: PREHEATING-EXEMPT FUEL GASIFYING STOVE

This invention relates to a preheating-exempt fuel gasifying stove, or burner.

It is found that most fuels for gasifying stoves are kerosene and Diesel fuel oil which are of high igniting point. Hence, in order to cause the fuel to be burned easily, it is commonly suggested to set a preheating procedure so that the fuel will be heated prior to its gasification thereby helping the combustion of the fuel. However, the temperature increased in such preheating procedure is often insufficient to cause a complete combustion, thus wasting fuel, lowering the efficiency as well as polluting the ~~circumstances~~ environment. Furthermore, the gasifying stove is usually connected externally with a tank of gas for igniting the gasifying fuel. Whereas, the gas tank will occupy a lot of space, causing much inconvenience in installation.

It is, therefore, an object of the present invention to provide a preheating-exempt fuel gasifying stove which may obviate and mitigate the above-mentioned drawbacks.

Indeed, applicant's attention is again redirected to the examiner's now restated lengthy and detailed discussion which lays out for applicant an extensive and certainly adequate scope of information establishing not only the level of ordinary skill in the art but also that which would have been obvious to a person having ordinary skill in applicant's field of endeavor. The

underlying principle and concept of the present invention is directed to a process of combusting of a synthetic, manufactured or non-naturally occurring hydrocarbon fuel of the type derived from or by a Fischer-Tropsch process, and wherein this combustion takes place in a "yellow flame burner". In this regard the examiner has presented the requisite and adequate information of fact to support the conclusion of obviousness. More precisely, It is first noted that, as suggested by US003808802 (Tanasawa), that as a general principle combustors employed in many fields, using heat energy, such a boilers, burners, steam motors, heating apparatus and water boilers operate generally using one of two types of combustion, "yellow flame combustion" and "the blue flame combustion." A person having ordinary skill in the art at the time of applicant's invention would have understood that the low sulfur, low nitrogen, low aromatic middle distillate (boiling in the range of 165.degree. to 345.degree. C. (about 330.degree. to 650.degree. F.)) fuels of **Suppes et al** , **US004764266 (Chen et al), US005807413 (Wittenbrink et al)** and **US006787022 (Berlowitz et al),** taught to be suitable fuels in many filed such as a "home heating oil, diesel and jet fuels", would necessarily be combusted in at least a burner of either a yellow or blue flame type, since the purpose and intent, and indeed understood motive, of **Suppes et al**, **US004764266 (Chen et al), US005807413 (Wittenbrink et al)** and **US006787022 (Berlowitz et al),** is to offer up to the person having ordinary skill in the art suitable alternative fuels who's purpose is to be consumed in combustion "heating" processes of many types, including "home heat" and "water boiler". Indeed, **US006787022 (Berlowitz et al)** expressly suggests that the properties of these Fischer-Tropsch derived fuels exhibit "**superior emissions performance"** and thereby providing a further motive for utilizing these fuels. Stated another way, applicant is merely attempting to claim the process of combustion already known fuels for their known purpose, and in a manner (producing a yellow flame) notoriously well known in the art, and indeed for the purpose of capitalizing on the known properties and advantages (e.g.- "superior emissions performance") designed into this (Fischer-Tropsch derived) fuels.

Regarding Fischer-Tropsch derived fuels applicant's attention is directed to **US006392108 (O'Rear)** and **US 6800101 (O'Reilly et al)** which discloses the following:

US006392108 (O'Rear):

"**Fischer-Tropsch** chemistry is typically used to convert the syngas to a product stream that includes combustible fuel, among other products. These Fischer Tropsch products have very low levels of sulfur, nitrogen, aromatics and cycloparaffins. The Fischer Tropsch derived fuels are considered **"green fuels"** and are desirable as environmentally friendly.

US 6800101 (O'Reilly et al):

(83) **Distillate fuels**, derived from the **Fischer-Tropsch process**, have **excellent burning properties**. Fischer-Tropsch products contain **essentially no aromatics** or **heteroatoms**, such as **sulfur and nitrogen**. In addition, Fischer-Tropsch distillate fuels are **highly paraffinic**; paraffins are the majority components **(>50%) and can exceed 70% and even 95%.** As a class, **paraffins** are the **most biodegradable compounds found in petroleum** and are preferentially metabolized by microbes. Alkane oxygenases are the enzymes that initiate paraffin (i.e. alkane) degradation. **In contrast to Fischer-Tropsch** products, **conventional hydrocarbonaceous** products **contain many components, with paraffins being only** a **minority component**.

With regard to the "lamba" (understood in the art as a ratio of fuel and air quantities) claimed by applicant while the examiner maintains the position that "claimed "lambda" values can be viewed as nothing more than merely a matter of choice in design and/or a result-effective variable", applicant's attention is further directed to **US006986255 (Smith et al)** which discloses that "Yellow flames are always indicative of fuel-rich flames…".

For the reasons set forth herein above and for the reasons set forth in the examiners action herein below the claimed invention remains rejected over the prior art of record**.**

In response to applicant's arguments against the references individually, one cannot show nonobviousness by attacking references individually where the rejections are based on combinations of references. See *In re Keller*, 642 F.2d 413, 208 USPQ 871 (CCPA 1981); *In re Merck & Co.,* 800 F.2d 1091, 231 USPQ 375 (Fed. Cir. 1986).

Drawings

The drawings are objected to under 37 CFR 1.83(a). The drawings must show every feature of the invention specified in the claims. Therefore, the "means for performing one or more procedures selected from the group consisting of heating water by indirect heat exchange with the flue gases in one or more boiler and heating space directly with the flue gases" a must be shown or the feature(s) canceled from the claim(s). No new matter should be entered.

Corrected drawing sheets in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. Any amended replacement drawing sheet should include all of the figures appearing on the immediate prior version of the sheet, even if only one figure is being amended. The figure or figure number of an amended drawing should not be labeled as "amended." If a drawing figure is to be canceled, the appropriate figure must be removed from the replacement sheet, and where necessary, the remaining figures must be renumbered and appropriate changes made to the brief description of the several views of the drawings for consistency. Additional replacement sheets may be necessary to show the renumbering of the remaining figures. Each drawing sheet submitted after the filing date of an application must be labeled in the top margin as either "Replacement Sheet" or "New Sheet" pursuant to 37 CFR 1.121(d). If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

Claims **1-7** and **9-21,** are rejected under 35 U.S.C. 103(a) as being unpatentable over **Suppes et al** (Compression-Ignition Fuel Properties of Fischer-Tropsch Syncrude, Ind. Eng. Chem. Res. 1998, 37 2029-2038) in view of **US004764266 (Chen et al), US005807413 (Wittenbrink et al)**, **US006787022 (Berlowitz et al**) and **US003808802 (Tanasawa).**

Suppes et al (Compression-Ignition Fuel Properties of Fischer-Topsch Syncrude, Ind. Eng. Chem. Res. 1998, 37 2029-2038) discloses burning light Fischer-Tropsch fuels or Syncrude (see page 2030, column 1, lines 27-36) in combustion apparatus such as internal combustion engines, as a suitable alternative to diesel and gasoline fuels (see page 2031, column 2, lines 4-35) in for example conventional diesel engines. Known light Fischer-Tropsch fuels disclosed by **Suppes et al** include the following properties:

- > 70% Fischer-Tropsch syncrude(see page 2031, column 2, lines 4-35), or 90% (by mass) of the light syncrude composition (see page 2029, column 2, lines 1-4);
- near-zero aromatic contents; and
- a boiling point of 170.6-314.9^{o} C (Table 1).

US004764266 (Chen et al) teaches, from applicant's same Fischer-Tropsch derived fuel field of endeavor, a process for using or burning middle distillate Fischer-Tropsch derived fuel having typically boiling in the 165 to 345.degree. C. (about 330.degree. to 650.degree. F.) with lesser proportions of naphtha as a **"home heating oil"** (see column 10, line 16-34). This middle distillate fraction is, however, relatively **low in sulfur** and generally meets product specifications for use as a light fuel oil, e.g. **home heating oil**, **diesel** and **jet fuels**. U**S004764266 (Chen et al)** acknowledges the presence of non-mineral fractions, or additives, in the Fischer-Tropsch distillate (e.g. – unconverted fractions).

US005807413 (Wittenbrink et al) teaches, from applicant's same Fischer-Tropsch derived fuel field of endeavor, that fuels produced by the Fischer-Tropsch process have essentially nil sulfur and nitrogen. See also, for example**, US006787022 (Berlowitz et al**) which teaches Fischer-Tropsch fuel characterized by "1) paraffins at least 90 + wt %, preferably at least 95 + wt %, more preferable at least 99 + wt % sulfur .ltoreq.10 ppm (wt), preferably <5

ppm, most preferably < 1 ppm nitrogen .ltoreq.10 ppm (wt), preferably <5 ppm, most preferably < 1 ppm aromatics <1%, preferably <0.1% cetane number >65, preferably >70, more preferably >75"). **US006787022 (Berlowitz et al)** yields of distillate fuels with excellent cold flow properties are produced from wax containing paraffins derived from the Fischer-Tropsch process to produce a full boiling range diesel fuel, preferably a **320-700** degrees F (i.e. **160-371** degree C) fraction, with the unique combination of high cetane number, very low cloud and cold filter plugging point (CFPP) performance and full boiling range cut exhibiting **superior emissions performance.**

US005807413 (Wittenbrink et al) discloses:

(7) By virtue of using the **Fischer-Tropsch** process, the recovered distillate **has essentially nil sulfur and nitrogen**. These hereto-atom compounds are poisons for Fischer-Tropsch catalysts and are removed from the synthesis gas that is the feed for the Fischer-Tropsch process. (Sulfur and nitrogen containing compounds are, in any event, in exceedingly low concentrations in synthesis gas.) Further, **the process does not make aromatics**, or as usually operated, virtually **no aromatics** are produced. Some olefins are produced since one of the proposed pathways for the production of paraffins is through an olefinic intermediate. Nevertheless, olefin concentration is usually relatively low.

(19) Although the studies in the three SAE papers did not deliberately vary either the density or the distillation profile of the fuels, these properties, of necessity, were varied as a natural consequence of changing the fuel cetane number and aromatic content. The results of these studies were that particulate matter (PM) emissions were primarily affected by the cetane number, sulfur content, oxygen content and aromatic content of the fuels. However, **neither fuel density nor distillation profile had any effect on particulate matter (PM) emissions in these studies.**

(Highlighting and Underlining Added)

US003808802 (Tanasawa) teaches, from applicant's same liquid combustion fuel field of endeavor, that is known to operate combustors used for various purposes such as for home use, for industrial use, for gas turbines and for jet engines, and operating under either "yellow flame" or "blue flame" conditions, with "all kind of fuels, such as gas fuel, gasoline, lamp oil, light oil, heavy oil and the like" and "can be equally burned in a wide range of air -fuel ratio".

US003808802 (Tanasawa) discloses the following:

"(3) The present invention relates to a vortex combustor which can be used for various purposes such as **for home use**, for industrial use, for gas turbines and for jet engines."

"(4) 2. The Prior Art

"… moreover, a high intensity combustion is carried out in the combustion chamber of the vortex combustor, so that **all kind of fuels**, such as gas fuel, **gasoline, lamp oil, light oil, heavy oil and the like**, can be equally burned in **a wide range of air -fuel ratio**."

"(5) In case of the various conventional combustors, because of their structure and severe operating condition, only in the narrow range of air -fuel ratio, the combustion efficiency and the combustion intensity (the weight of fuel which can be burned per unit time in the unit volume,or calorific value of the said fuel; kcal/m.sup.3 -hr-atm) can be kept high in some degree. In the case of such combustors designed for gas turbines and for jet engines, it is necessary to supply a large amount of air into the combustion chamber in proportion to its output. If this air flow increases, combustion flame does not spread to the whole inside wall of the combustion chamber, and the mixture of air and fuel is not burned with high intensity, so the combustion efficiency and the combustion intensity becomes low. While there have been many studies about vortex combustors, a satisfactory combustor for practical use has not yet been provided, mainly because of the fact that these studies haven't cleared up some of the important characteristics of vortex combustors."

"(68) Since the fuel stays for a long period of time in the first and the second combustion chambers because of the swirling flow pattern, the combustion efficiency becomes as high as nearly 100 percent, whether the combustion condition in the combustion chamber is the **yellow flame** combustion or the **blue flame** combustion."

"(86) The vortex combustor of the present invention can be applied to various combustors using heat energy **for home** use or industrial use, and various combustors for heat motors using mechanical energy converted from heat energy, besides gas turbine engines for automobiles and for aircraft, which are described herein with relation to the first and second embodiments. For example, they can be **used as various combustors using heat energy, such a boilers, burners, steam motors, heating apparatus and water boilers**. They **can also be used as the combustors for** heat motors using mechanical energy which is converted from heat energy, such as various steam turbines, gas turbines, jet engines and steam engines, which **can be employed in many fields,** for example, for aircraft, ships, motor vehicles, electric generation and for industrial motive force in various works."
(Highlighting and Underlining Added)

In regard to claims **1-7, 9-17** and **18-21**, for the purpose for providing an alternative fuel for conventional home heating systems, it would have been obvious to a person having ordinary skill in the art to operate home heating systems including burners fueled with Fischer-Tropsch fuel having no additives and "nil" or less than 1 ppm nitrogen and sulfur and low aromatic content and a density similar to that of home heating fuels (i.e. – between 0.65 and 0.8 g/cm^3 at 15^o C), in view of the teaching of the **US004764266 (Chen et al)** and **US005807413 (Wittenbrink et al)** and **US006787022 (Berlowitz et al).** In addition, in view of the teaching of **US003808802 (Tanasawa),** it would have been obvious to a person having ordinary skill in the art to operate combustion systems used for various purposes such as for home use, for industrial

use, for gas turbines and for jet engines with all kind of fuels such as a Fischer-Tropsch fuel and which generally meets product specifications for use as a light fuel oil, e.g. home heating oil, diesel and jet fuels, wherein the burner is capable of operating in a wide range of air-fuel ratio, or "lambda".

In regard to claims **13-15**, Official Notice is taken that it is well known to provide liquid fuels with odor or aroma (see for example US001944175) and color markers (See for example US005560855), and yellow flame coloring additives, for the purpose of aiding in readily identifying the fuel, and for aiding in making the flame visible (see for example US2002/0090585 or US006488726). Thus, in view of that which is well know in the art and for the known purpose, it would have been obvious to a person having ordinary skill in the art to modify the **Suppes et al** fuel to include odor and color markers.

In regard to claims **2, 3, 11, 15-17** and **18-21** since the 1) "lambda" (assumed for the sake of examination to refer to the ratio of an oxidant to fuel necessary for combustion), 2) the number of burner operations per hour, and 3) the type of flame detector used to detect the burner flame, would necessarily depend on numerous design concerns such as the operational characteristics of a given burner and heating system installation and the type of oxidant being used, and would necessarily and predictably result from optimization of a given burner and heating system installation, the claimed "lambda" values can be viewed as nothing more than merely a matter of choice in design and/or a result-effective variable, i.e., a variable which achieves a recognized result. Generally, differences in concentration or temperature will not support the patentability of subject matter encompassed by the prior art unless there is evidence indicating such concentration or temperature is critical. "[W]here the general conditions of a claim are disclosed in the prior art, it is not inventive to discover the optimum or workable ranges by routine experimentation." In re Aller, 220 F.2d 454, 456, 105 USPQ 233, 235 (CCPA 1955).

Conclusion

See the attached USPTO Form 948 for prior art made of record and not relied upon which is considered pertinent to applicant's disclosure.

Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

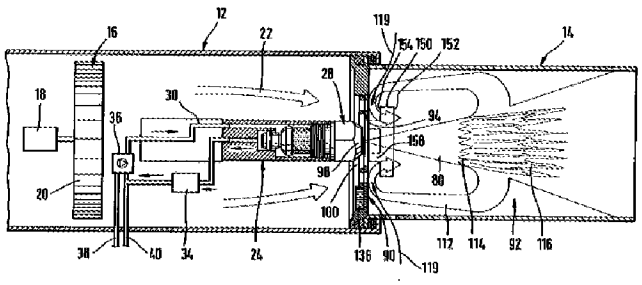
WO 9516882 A1 (KNAPP ET AL)

Blue-flame burner with optimized combustion characteristics.

ABSTRACT:

The invention concerns a liquid-fuel burner comprising a housing (10), a **precombustion** chamber (48) containing a nozzle assembly (24) with a nozzle (28) which produces a jet of fuel (80), a combustion chamber (92) in which the fuel jet broadens out, a partition (90) between the precombustion and combustion chambers, and a fan (16) designed to force a stream of combustion air into the combustion chamber, the fuel burning essentially stoichiometrically with a **blue flame**. In order to improve the burner to minimize the amounts of pollutants in the combustion gases, the invention proposes that, in addition to a stream of combustion air (102) entering the combustion chamber near the fuel jet, a second, recirculation-stabilizing stream of air (106) enters opposite the first stream, at a defined radial distance further out from the first stream. Inside the combustion chamber, an inner recirculation stream (112) is formed which is stabilized by the second stream of combustion air.

Fig.10

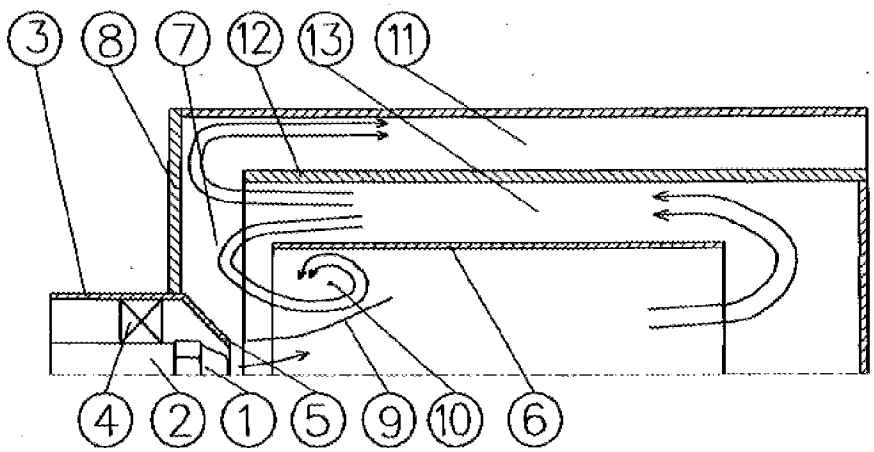


DE 19834051 A1 (KOEHNE et al)

ABSTRACT:

An improved design of burner for **liquid fuels** has the fuel and air mixture directed into a vaporizing chamber (6) coaxial inside the burn chamber (11) and with a return flow (13) between the two chambers. Part of the return flow, which has a c**old flame** effect, is ducted back into the **vaporizing chamber** to enhance the phase change of the fuel. The remainder of the **cold flame** effect mixture of **fuel vapour**, oxygen and other gasses passes into the burn chamber at a reduced start temperature for an improved burn without depositing cracking compounds anywhere in the system.

Fig. 3: Schnittdarstellung eines Brenners

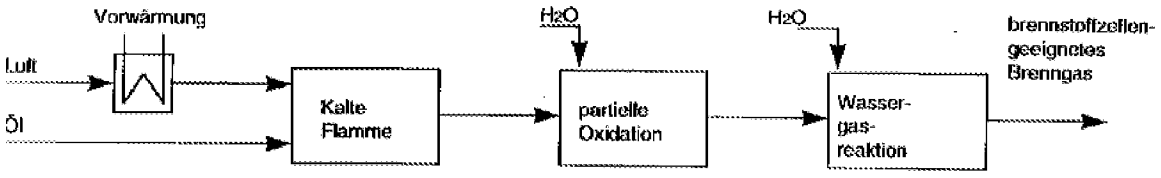


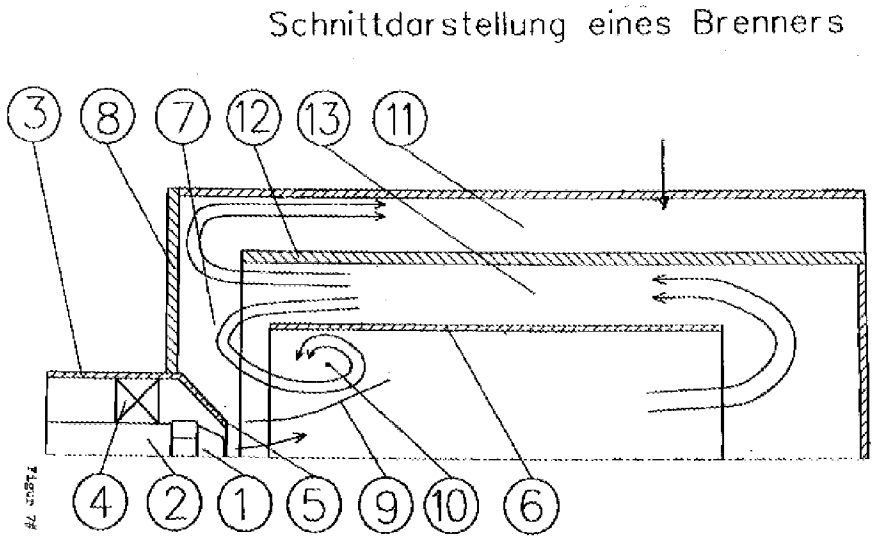
DE19860308 (KOEHNE et al)

ABSTRACT:

Process for evaluating a fuel comprises contacting the fuel with an oxidizer in a reaction chamber and adjusting the residence time in the chamber with limited removal of heat. Process for evaluating a fuel comprises: (A) contacting the fuel with an oxidizer heated to 520-880 K or at low pressure with a reduction of temperature and a molar ratio C/O of 1: 0.14-0.25 in a reaction chamber, in which exothermic prereactions are initiated in a cold flame that effects only a partial conversion of the fuel and the oxidizer on homogenous mixing of the fuel and oxidizer;

and (b) adjusting the residence time tv of the mixture produced in step (a) in the reaction chamber tv 25 ms at p not more than 1 with limited removal of heat from the reaction zone via an inert gas flow and/or the reaction chamber wall resulting in kinetic inhibition of the further reaction of the oxidizable mixture obtained by the cold flame.





US006787022 (Berlowitz et al) disclose:

(1) paraffins at least 90 + wt %, preferably at least 95 + wt %, **more preferable at least 99 + wt** % **sulfur** .ltoreq.10 ppm (wt), preferably <5 ppm, **most preferably < 1 ppm nitrogen** .ltoreq.10 ppm (wt), preferably <5 ppm, **most preferably < 1 ppm aromatics** <1%, **preferably <0.1%** cetane number >65, preferably >70, more preferably >75

(Highlighting and Underlining Added)

US004111642 (Kopp) discloses:

"(8) If the burner of FIG. 2 is to be started up, switchover device 17' is moved in the direction of arrow 34, and tubular member 31 acting as a shield closes long slits 30 so that the combustion air can be guided in the direction of arrow 36 between the two air feed pipes 22 and 23. When the mixture-distributor 10 is sufficiently heated, switchover device 17' will be shifted in the direction of arrow 33 coaxially to the burner feed pipe, and then funnel 32 of tubular piece 31 will abut neck 35, thereby blocking off annular passage 29 so that the combustion air will now be guided in the direction of arrow 37 via air feed pipe 22. Immediately thereafter the flame, which previously **burned yellow**, will **burn blue**."

(Highlighting and Underlining Added)

US004302180 (Le Mer) discloses:

8) According to another known burner principle, the liquid fuel is gasified, for example in a pot, and then burnt, mixed with air, in the form of **yellow flame**, sometimes **blue, according to the method adopted.** This form of combustion has the drawback of being difficult to control, according to the draft of the chimney, and generally necessitates an excess of air, which reduces the yield.

(Highlighting and Underlining Added)

US004629414 (Buschulte) discloses:

This invention applies to many various oil or gas burners and is explained below based on an exemplary Bunsen type burner, i.e. a burner in which oil is burned completely with **blue flame**. **The invention is not, however, limited to such burner type.** The desired noise reduction may be obtained using the features defined herein, also in the case of, for instance, preheating burners or torches and **yellow-flame** burners.

(Highlighting and Underlining Added)

DE004323300A1 (English Language Abstract) discloses:

The device includes an air-guiding member (1) which is arranged in front of a burner nozzle (4) in order to generate a first airflow for recirculation and a second airflow for mixture preparation. The air-guiding member (1) has swirl elements (11, 15) in order to divide the airstreams into partial airstreams (13, 17) and, with simultaneous or subsequent deflection, direct them tangentially or radially to the fuel. The **device can be used in burners** with **blue** or **yellow burner flame**

USE/ADVANTAGE - Mixing device in burner produces **blue and/or yellow flames** in the burner and **to reduce effectively the production of NOx**.

(Highlighting and Underlining Added)

US004090854 (Davis) discloses:

> The **normally liquid fuel compositions** of this invention normally **are based on fuels derived from petroleum sources, e.g., normally liquid petroleum distillate fuels**, though they may include those produced synthetically by the **Fischer-Tropsch** and related processes, the processing of organic waste material or the processing of coal, lignite or shale rock. **Such fuel compositions have varying boiling ranges, viscosities, cloud and pour points, etc., according to their end use as is well known to those of skill in the art. Among such fuels are** those commonly known as motor and aviation gasoline, diesel fuels, **jet engine fuel**, kerosene, distillate fuels, **heating oils**, **residual fuels**, bunker fuels, etc. The properties of such fuels are well known to skilled artisans as illustrated, for example, by ASTM Specifications D #396-73 (Fuel Oils) and D #439-73 (Gasolines) available from the American Society for Testing Materials, 1916 Race Street, Philadelphia, Pa., 19103. Fuels containing non-hydrocarbonaceous materials such as alcohols (e.g., **methanol**).

US005378348 (Davis et al) discloses:

A flame burner comprising: burning a **Fischer-Tropsch** derived fuel which "boils", or has a boiling point, between 160 degrees C and 400 degrees C (320°/500° F: i.e. - 160°/260° C) in the burner of a jet engine (see column 1, lines 41-64) when used as a jet fuel to obtain flue gases and a flame. With regard to claim 5, when used in the burner of a jet engine the space about the exit of the engine is necessarily heated, therefore **US005378348 (Davis et al)** meets the broadly stated limitation of "**heating a space directly with the flue gases**".

Conclusion

See the attached USPTO for, 892 for prior art made of record and not relied upon which is considered pertinent to applicant's disclosure.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to CARL D. PRICE whose telephone number is (571) 272-4880. The examiner can normally be reached on Monday through Friday between 9:0am-5:30pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Steven B. McAllister can be reached on (571) 272-6785. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

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